FINAL INSPECTION REPORT
United States Environmental Protection Agency (EPA) Region 4
Air Enforcement Branch

I. GENERAL INFORMATION

Facility Name: North Shelby Landfill, BFI Waste Systems of North America, Inc.

Location (Address): 711 Old Millington Road, Millington, TN 38053

Inspection Dates: November 29-30, 2022

Type of Inspection (Full or Partial Compliance Evaluation):
Clean Air Act Partial Compliance Evaluation

ICIS-Air Number: TNSHL0004715700698

EPA Investigator(s)/Inspector(s):
David Lloyd, Andrew Mills

State/Local Investigator(s)/Inspector(s):
Jeff Grills, Pollution Control Section – Major Source Branch,
Shelby County Health Department

Wasim Khokhar, Supervisor, Major Source Branch – Pollution Control Section,
Shelby County Health Department (present on November 29 only)

Person(s) Contacted at Facility (Name and Title):
Slade Patterson, Environmental Manager, Republic Services

Michael Darnell, Republic Services, Phoenix, AZ office (present on November 30 only)

Report Prepared by: David Lloyd

II. FACILITY INFORMATION

A. Facility and Permit Information

Facility and Permit Information	Comments
1. Type of facility (e.g., chemical plant, refinery, cement manufacturer, etc.).	Municipal Solid Waste Landfill
2. Air permit number(s) and type of permit (e.g., Title V, PSD, Synthetic Minor, etc.).	Title V permit 00698-01TV
3. Air permit issuance date.	May 1, 2015
4. Air permit expiration date.	May 1, 2020
5. Facility classification (Major, Synthetic Minor/Conditional Major, Minor).	Major Source
6. Major source pollutants (if applicable).	HAPs
7. Applicable regulations (e.g., State Implementation Plan, MACT Subpart FFFF, NSPS Subpart EEEE, etc.).	40 C.F.R. Part 62, Subpart OOO 40 C.F.R. Part 60, Subpart WWW 40 C.F.R. Part 63, Subpart AAAA
8. Types of air emission points (e.g., tanks, process vents, boilers, etc.).	Gas collection and control system (GCCS), landfill surface emissions.
9. Types of air pollution control equipment (e.g., baghouse, scrubber, afterburner, etc.).	Two flares

B. Process Description (provide narrative or attach description provided by the company or excerpts from the permit)

The North Shelby Landfill receives municipal and industrial solid waste. The waste is deposited into the landfill, compacted, and covered with fill dirt or other suitable cover, on a daily basis. Landfill gas (LFG) is produced from the decomposition of the buried waste. It is composed primarily of methane and carbon dioxide and contains a small percentage of non-methane organic compounds (NMOC). The

landfill operates two flares for the control of landfill gas; the "main flare" controls the currently active landfill on the northeast portion of the property, and the "mini flare" controls a closed landfill to the southwest of the active landfill. The landfill also sends landfill gas to a separate facility located within the landfill property for treatment and subsequent injection of the treated gas into a natural gas pipeline.

III. INSPECTION ACTIVITIES

Activity	Yes No NA	Comments
Opening Meeting		
1. Date and time entered the facility.	Y	November 29, 2022, at approximately 9:05 a.m.
2. Credentials presented to facility personnel (include name and title).	Y	The EPA inspectors presented their credentials to Slade Patterson.
3. Conducted an opening meeting to explain the purpose and objectives of the inspection.	Y	An opening meeting was held in a conference room during which EPA explained that the agency would be conducting an inspection under the Clean Air Act and that monitoring for methane emissions from the facility would be conducted per Method 21. Topics discussed and information gathered during the opening meeting are listed in Attachment A.
4. Discussed safety issues.	Y	The EPA inspectors wore the appropriate PPE as well as the standard yellow vest required by the facility. The EPA inspectors and Shelby County personnel were accompanied by Slade Patterson while walking and driving around the facility.
5. Discussed which records to be reviewed.	Y	See item 10

Activity	Yes No NA	Comments
6. Discussed the facility walk-through and the areas to be observed in the facility.	Y	The EPA inspectors explained that the purpose of the inspection was to conduct a walk-though of the facility and to sample methane emissions at the landfill to assess the effectiveness of the landfill gas collection and control system.
7. Discussed facility policy regarding photographs or video (if applicable).	Y	The inspectors explained that any photographs or video taken would be provided to the facility.
8. Discussed the use of the infrared camera, TVA, PID, and any other equipment.	Y	Discussed the use of a digital camera, an infrared and a methane monitor (Inficon Irwin device).
9. Discussed CBI.	Y	The EPA inspectors indicated that any documents claimed to be Confidential Business Information (CBI) would be treated in accordance with the regulations.
Records Reviewed at the Facility		
10. The types of records reviewed and the time period reviewed.	Y	Records were not reviewed at the facility. A request was made for specific documentation. EPA will prepare an information request for these documents under Section 114 of the CAA.
Facility Walk-Through Observations		

Activity	Yes No NA	Comments
11. The process equipment observed and the associated operational rate observed (e.g., Furnace 1 production rate was 5 lbs/hr on 1/1/15, at 2:00 pm – permit requires max rate at 6 lbs/hr). Provide the date and time the information was recorded by the inspector. Identify the permit limit (if applicable). An attachment may be used for a large amount of information.	Y	Observations made during the inspection and a description of photographs and video taken are recorded in Attachment A of this report.

Activity	Yes No NA	Comments
12. The type of process parametric monitoring observed and the associated value observed (e.g., Furnace 1 flux injection rate was 200 lbs/batch at 1/1/15, at 2:00 pm – permit requires max rate at 225 lbs/batch). Provide the date and time the information was recorded by the inspector. Identify the permit limit (if applicable). An attachment may be used for a large amount of information.	N/A	

Activity	Yes No NA	Comments
13. If process equipment or parametric monitoring equipment was not operating, state the reason by facility personnel why the equipment was not operating.	N/A	

14. The type of air pollution control equipment, the process equipment it is controlling, and the associated parametric monitoring value observed (e.g., baghouse pressure drop, temperature, scrubber flow rate, etc.). (For example - RTO 1 controlling furnace 1, 1,500 degrees F on 1/1/15, at 2:00 pm – permit requires 1,400 degree F or higher). Provide the date and time the information was recorded by the inspector.	N/A	

Activity	Yes No NA	Comments
Identify the permit limit (if applicable). An attachment may be used for a large amount of information.		
15. Continuous emissions monitoring devices and values observed. (e.g., CEMS, COMs, etc.). Provide the date and time the information was recorded by the inspector. Identify the permit limit (if applicable). An attachment may be used for a large amount of information.	N/A	

Activity	Yes No NA	Comments
16. If air pollution control equipment was not operating, state the reason by facility personnel why the equipment was not operating.	N/A	
17. Capture and collection system (enclosures and hoods) observations, if applicable (e.g., the magnitude and duration of emission escaping capture from the hood).	N/A	

Activity	Yes No NA	Comments
18. Ductwork transferring the emissions to the air pollution control device observations, if applicable (e.g., the magnitude and duration of emission escaping from the ductwork, holes or deterioration in ductwork, no deterioration observed, etc.).	N/A	

Activity	Yes No NA	Comments
19. Any existing unpermitted emission points, new unpermitted emission points, or non-permitted construction activities observed. (if yes, describe in the comments field).	N/A	
20. Were any visible emissions observed? (if yes, identify the location and equipment).	N	
21. Was a Method 9 reading performed? (if yes, identify the location and equipment).	N	

Activity	Yes No NA	Comments
22. Was the cause of the visible emissions investigated and the information documented?	N/A	
23. Was a Method 22 performed for visible emissions? (if yes, identify the location and equipment).	N	
24. Identify the cause of the visible emissions as explained by facility personnel, if applicable.	N/A	

Activity	Yes No NA	Comments
25. Was the infrared camera used? If so, attach the video log (which includes the equipment ID, and the date and time the video was recorded) and videos to this report.	Y	See Attachment A for a list of video files.

Activity	Yes No NA	Comments
26. Was the TVA used? If so, identify the equipment monitored and the results. Provide the date and time the information was recorded by the inspector. Include actual instrument readings for each piece of equipment monitored above the leak definition and/or where the infrared camera identified a release. An attachment may be used for a large amount of information.	N	An Inficon Irwin monitor was used to quantify methane concentrations near the surface of the landfill. See Attachment A for a description/schematic of the results. Files containing instrument calibration data, background readings, and surface readings include: -Calibration_Background_Report_NorthShelby_2022_11_29.pdf -MONITOR_NorthShelby_2022_Q4_Initial.csv -VERIFICATION_92004594_2022_11_30_09_25.csv -MONITOR_NorthShelbyday2_2022_Q4_Initial.csv

Activity	Yes No NA	Comments
27. Was the PID used? If so, identify how the PID was used and the results. Provide the date and time the information was recorded by the inspector. An attachment may be used for a large amount of information.	N	
Closing Meeting		
28. Conducted a closing meeting.	Y	Items discussed are provided in Attachment A.
29. Summarize any additional information needed, if applicable?	N/A	
30. Accept a declaration of CBI, if applicable?	N/A	

Activity	Yes No NA	Comments
31. Discussed observations.	Y	The inspection team discussed the results of surface methane monitoring with facility representatives. Methane concentrations above 500 ppm were pervasive at all areas of the landfill monitored. The EPA expressed concerns that the landfill gas collection and control system was performing poorly. Approximately 1/3 of the currently active portion of the landfill was monitored during the inspection.
32. Discussed next steps, if applicable?	Y	It was communicated that the facility would be sent a draft inspection report so they could review it for CBI content.
33. Date and time inspection concluded.		November 30, 2022, 12:40 p.m.
Miscellaneous		
34. Include any additional observations, if applicable.	N/A	

EPA Investigator/Inspector Signature: DAVID LLOYD Digitally signed by DAVID LLOYD Date: 2023.01.31 09:38:41 -05'00'

EPA Supervisor Signature & Title: JASON DRESSLER Digitally signed by JASON DRESSLER Date: 2023.01.31 10:55:52 -05'00'

Chief, North Air Enforcement Section

Attachment A – Inspection Activities and Observations

Opening Meeting, November 29, 2022

The following information concerning landfill infrastructure and operations was gathered during the opening meeting with Slade Patterson:

- The facility has two main disposal areas, a closed and capped landfill on the southwest side of the facility and an active landfill on the northeast part of the facility. The closed landfill has not received waste since the 1990s.
- The landfills typically generate about 1700-1800 cubic feet per minute (cfm) of landfill gas.
- Landfill gas generation at the time of the inspection was about 1400 cfm.
- The facility sends landfill gas to a landfill gas processing facility operated by Archaea Energy Inc (subsequently referred to in this report as the "gas plant"). The gas plant is permitted as a separate source. The permit for this source lists Clean Energy Renewable Fuels Shelby, LLC as the owner/operator. The gas plant's purpose is to receive landfill gas, remove contaminants, and provide pipeline natural gas for distribution. The gas plant has a thermal oxidizer and a flare as control devices.
- The active landfill has a "main flare" rated to accept up to 3000 cfm of landfill gas. This flare is normally not in operation as the landfill gas normally is sent to the gas plant. The main flare is, at a minimum, operated for a short period on a monthly basis to confirm that it is operational.
- There are currently 67 landfill gas collection wells in use at the closed/capped landfill. Most of the landfill gas generated from the closed landfill is directed to the "mini flare" which is normally in operation. However, the gas collected from 11 of the 67 wells is considered to be of sufficient quality and quantity to send to the gas plant rather than the mini flare. These wells are isolated from the rest of the system serving the closed landfill with a valve. The closed landfill typically generates about 280 cfm of landfill gas, about 120 cfm of which is sent to the gas plant.
- The facility has approximately 20 soil vapor extraction wells to control landfill gas that has migrated in the subsurface beyond the waste footprint.
- About 60-70% of gas collection wells at the facility are equipped with pneumatic pumps with float valves to reduce leachate levels in the wells.
- Currently there is a project underway on the active landfill to replace lateral headers in the landfill gas collection system and to redrill/replace 12 gas collection wells. This project is expected to take 4-5 weeks to complete.
- The closed landfill gas collection system is served by one blower, and the active landfill in controlled by two blowers.
- The facility monitors the quality of landfill gas going to the gas plant very closely as it must meet certain specifications. The concentration of oxygen plus nitrogen must not exceed 2%.
- Normally, Republic Services does not operate the blowers, as gas plant personnel are responsible for providing "suction." In response to off-specification gas, gas plant personnel

(Archaea Energy employees) investigate measures to be taken, and requests that Republic make specific changes to the landfill gas collection system to remedy the problem. Republic technicians will take actions such as adjusting valves to change total flow and the distribution of gas flow from specific portions of the landfill, checking for watered in sumps, or tightening connections. Arcadis employees have made such changes themselves on occasion.

- The gas plant is currently installing a nitrogen control system that is expected to provide flexibility in how the landfill gas collection system is operated and allow for increased pressure and flow.
- In response to a question of what measures are typically implemented to reduce elevated surface methane emissions identified during quarterly monitoring events, the following items were identified:
    - Increasing landfill cover in specific areas;
    - Checking nearby wells to make sure they are operating properly, including checking pumps and liquid levels; and
    - Adjusting valves to increase pressure/flow in the gas collection system in specific areas.
- A "to do" list to remedy problems identified at the landfill is typically generated on a weekly basis.
- Decisions to expand the landfill gas collection system are made considering a combination of factors including well data, surface emissions and odors.
- Leachate generated from the facility is collected in two tanks and is sent to a publicly owned treatment system after being processed to control ammonia levels using a charcoal filter.

Facility "Walk Through"

The inspection team set out in vehicles to view the facility. The team followed Slade Patterson, who rode in a separate vehicle. The following areas were visited:

November 29, 10:13 a.m. - The area of the facility where the "main flare" is located along with the Archaea facility was visited at about 10:15 a.m.

- The main flare was not in operation.
- Flame from the flare located at the Archaea facility was visible intermittently while the inspectors were present.

November 29, 10:21 a.m. – The "mini flare" was viewed and was in operation. This flare is equipped with a flame detector and if a flame is not present, landfill gas collection will automatically cease.

November 29, 10:30 a.m. – The inspection team viewed the active disposal activities on the northwest side of the landfill (cell 3E).

November 29, 10:43 a.m. – The inspection team viewed activities at the top of the active landfill where the project to install/replace lateral headers and gas collections wells had begun.

November 29, 10:59 a.m. – The inspection team visited the leachate collection area of the landfill and viewed a leachate storage tank, a leachate processing tank and a charcoal filter used to control ammonia before leachate is sent to a POTW.

November 29, 11:15 a.m. – With storms approaching the area, the inspection team left the facility for lunch.

Surface Methane Monitoring

November 29, 12:45 a.m. – The inspection team returned to the facility, calibrated an Inficon Irwin methane monitor and began collecting readings of methane emissions. Files containing the data from the monitor for both days of the inspection are listed in item 26 of this report (note: the times listed in these files are Eastern Standard Time). The response time for the instrument was approximately 4 seconds for both days. Surface monitoring activities were focused primarily on penetrations of the landfill cap, including gas collection wells and other penetrations. The air intake for the sampling device was fastened to a trekking pole so that it would sample gas approximately 3 inches (7.5 cm) above the surface of the landfill. The probe was positioned along the circumference of each penetration monitored at several locations and allowed to stand at least 8 seconds (twice the response time of the instrument). The maximum reading was then recorded along with the location of each reading. The readings were adjusted to factor in background methane concentrations per method 21. Surface monitoring continued until approximately 4:15 p.m. on November 29.

November 29, 4:15 p.m. – The flare at the Archaea was viewed as the inspection team was driving to the facility entrance and was observed to be operating.

November 29, 4:25 p.m. – The inspection team left the facility after communicating that the inspection would resume the following day.

November 30, 9:00 a.m. – The inspection team returned to the facility to resume surface monitoring activities. The sampling device had been calibrated previously that morning, and new background measurements were taken. Surface monitoring continued until approximately 12:20 pm. Several of the penetrations monitored on November 30 were repeats of penetrations monitored the previous day. The Google Earth image below depicts the locations of methane readings greater than 500 ppm, as adjusted to factor in background. It is estimated that EPA's surface monitoring covered approximately 25% of the surface of the currently active landfill.

Methane was measured at 72 landfill cap penetrations over the two-day inspection (mostly gas collection wells, but other penetrations as well). Methane concentrations at 61 of the 72 penetrations monitored exceeded the 500-ppm threshold (Note: a gas collection well might have two or three other penetrations associated with it. Often more than one, or all the penetrations close to each gas collection

well were over the 500-ppm threshold. If this was the case, only one reading was recorded for the entire well cluster.) There were also six locations above 500 ppm that were not associated with penetrations.

Locations where surface emissions were determined to be >500 ppm during the inspection.

Closing Meeting – November 30, 2022, 12:30 p.m.

A brief closing meeting was held in Slade Pattersons office. It was explained that it is not EPA's policy to make definitive compliance determinations during an inspection. However, EPA did voice concerns that based on sampling results showing numerous locations where methane was detected at concentrations above 500 ppm (essentially, every area that EPA monitored during the inspection), that the landfill gas collection and control system was functioning poorly. EPA discussed the next steps, including that the facility would receive a draft inspection report in order to conduct a review for potential CBI review, and a request was made for the following documentation:

- Quarterly Surface Emission Monitoring SEM reports for each quarter in 2022 (The Landmarc reports);
- Surface integrity reports for the last 12 months; and
- The monthly gas collection well data, including temperature, pressure and water level readings for the last 12 months.

EPA indicated that the facility could provide the documents at that point, or email them after the inspection or, if preferred, EPA would issue a subsequent letter under Section 114 of the Clean Air Act (Note, after discussions and emails in follow up to the inspection, the facility indicated that it would wait to receive the information request letter before responding.).

The inspection was concluded at approximately 12:40 p.m. on November 30, 2022.

Photo/Video Log

File Name	Date	Time	Description
MOV-1147.mp4	11/29/2022	10:14 AM	Video of Enclosed Flare at Archaea facility
MOV-1148.mp4	11/29/2022	1:03 PM	Emissions from landfill surface, Cell D
MOV-1151.mp4	11/29/2022	2:46 PM	Landfill cap penetration emissions
MOV-1152.mp4	11/29/2022	2:51 PM	Landfill gas emissions - Gas well GCS5
MOV-1153.mp4	11/29/2022	2:59 PM	Landfill gas emissions - HDW2
MOV-1154.mp4	11/29/2022	3:01 PM	Landfill gas emissions - leachate sump HDW2 8 inch cleanout
MOV-1155.mp4	11/29/2022	3:34 PM	Landfill gas emissions - gas collection well 347a
MOV-1156.mp4	11/30/2022	10:54 AM	Landfill gas emissions - gas collection well 185
MOV-1157.mp4	11/30/2022	10:55 AM	Landfill gas emissions - gas collection well 145a
PB290496.JPG	11/29/2022	10:14 AM	Main flare - not in operation

PB290497.JPG	11/29/2022	10:14 AM	Enclosed flare at Archaea facility - operating
PB290498.JPG	11/29/2022	10:21 AM	Mini flare - in operation
PB290499.JPG	11/29/2022	4:15 PM	Enclosed flare at Archaea facility - operating
PB290500.JPG	11/29/2022	4:16 PM	Enclosed flare at Archaea facility - operating
PB290501.JPG	11/30/2022	11:16 AM	Landfill surface